BOEM ENVIRONMENTAL STUDIES PROGRAM: Planned New Study

Region: Pacific

Planning Area(s): Washington-Oregon

Title: Year-round and Diel Patterns in Habitat-use of Seabirds off Oregon (PC-14-03)

BOEM Information Need(s) to be Addressed: The State of Oregon and BOEM are actively engaged in marine spatial planning for siting of offshore energy projects within the territorial sea and OCS regions. *In situ* tests of commercial-scale wave energy converters (WEC) have occurred in recent years and the installation of the first WEC testing system was installed in the summer of 2012. The first installation and testing of grid-connected devices are planned to occur in 2013. While the initial focus is on WECs, offshore wind energy development is also being actively pursued off Oregon. Through recent retrospective studies, meetings, and gap analyses, several critical data needs for seabirds were highlighted. These data needs include quantitative information on year-round, diurnal/nocturnal, and weather-related patterns in movements, behaviors, residence time, and migration corridors for seabirds. The best way to fill these data gaps is through individual tracking studies complemented with direct observations. Over the past decade Oregon State University, USGS, and collaborators have used sophisticated telemetry techniques for behavioral tracking studies for several migratory seabird species that visit the California Current System (CCS). With recent technological advances, we can now expand these studies to include locally breeding and wintering species that dominate marine bird communities off Oregon and the Northern CCS. By integrating these data with physical variables we can improve predictive habitat-use models currently needed to inform site-specific and broad-scale marine spatial planning of the OCS. Results from tracking studies combined with previous transect surveys data will provide capability for comprehensive, spatially explicit vulnerability models for seabirds potentially impacted by wave- and wind-energy conversion device siting. Lastly, this study complements ongoing BOEM-supported habitat mapping and ranging behavior study in Hawaiian waters and adds significant new data to include in the *California Current System Seabird Telemetry Atlas*, currently in progress.

Total BOEM Cost: TBD **Period of Performance:** FY 2014-2016

Conducting Organization: TBD

Principal Investigator: TBD

BOEM Contact: David Pereksta

Description:

Background: Oregon hosts approximately 1.2 million breeding seabirds and even more summer and winter migrants with at-sea residence times of days to months. Common Murres are the most abundant breeding bird (50% of breeding population), followed by storm-petrels (37%), cormorants (5%), and gulls (2%). Common Murres, along with loons, grebes, and seaducks, are

the most abundant overwintering species. At times of the year, shearwaters and albatrosses also are abundant. Several species, including the Short-tailed Albatross and Marbled Murrelet, are federally protected under the U.S. Endangered Species Act. Limited tracking data currently exist for larger bodied, non-resident species (albatrosses, Sooty and Pink-footed Shearwaters), and very little, if any, for numerically dominant breeding, overwintering, and migratory species. Oregon seabirds can be used to identify ocean regions of important community-level food-web interactions and trophic transfer of energy. Furthermore, some have adapted ranging behaviors, morphologies, and flight characteristics that capitalize on energy associated with predominant wind patterns and wave energy. Oregon seabirds face increasing threats at sea, including interactions with fisheries, pollution, and climate change. Increasing interest in ocean-based alternative energy and certain activities associated with development of these energy resources pose additional risks for seabirds. Seabird interactions with wind-turbine structures, lighted facilities, elevated power lines on land, and lighted ships at sea have been documented in many regions, and we lack comprehensive knowledge of seabird distribution and behavior to inform siting decisions and minimize risk to seabirds at sea.

Objectives: Emphasis will be to fill knowledge gaps identified in recent BOEM reports with three objectives: (1) conduct multi-species and multi-scale quantification of at-sea habitat utilization and ranging behaviors for breeding and non-breeding seabirds off the Oregon coast, (2) compare and integrate results with existing transect survey data, and (3) compile and provide an analysis of remotely sensed and model-derived habitat data (e.g., chlorophyll concentrations, sea surface temperature, sea surface height, sea level pressure, and wind speed/direction) to examine habitat relationships that can be used to predict species' distributions and improve spatial vulnerability (i.e., risk) maps.

Methods: (1) Newly available micro-electronic tracking devices will be used to quantify at-sea movements and range behavior of breeding seabirds on the Oregon coast. Specifically, fine-scale, short-term (GPS) and coarse-scale, long-term (Argos, GLS) tracking devices will be deployed on breeding birds at or near important breeding colonies. Non-breeding/migratory species that use the CCS will be captured and outfitted at-sea or on breeding colonies prior to migration. (2) Spatially explicit habitat modeling to combine seabird utilization with oceanographic habitat will be used to generate mapped species probability distributions and community-level hotspot areas. (3) To evaluate three-dimensional risk, numerical models that relate flight behavior with fine-scale (2-6 km) winds and waves (c.f., *Hawaiian seabird ranging study*) will be generated and supplemented using direct observations during peak migrations through the CCS. All new regional telemetry data will be integrated with existing telemetry-based information on at-sea utilization and behavior of non-breeding, migratory species (e.g., Short-tailed and Black-footed Albatrosses, Sooty and Pink-footed Shearwaters).
Results will include (1) raster-based maps of species utilization distributions within state and federal waters off Oregon (and throughout the CCS and U.S. exclusive economic zone) and (2) numerical models that relate environmental variables, including wind speed and direction, to seabird flight speed, direction, and altitude above the sea surface. Results will be provided in scientific presentations, peer-reviewed scientific papers, and in a readily accessible, comprehensive marine GIS package currently under development by USGS and collaborating scientists.

Current Status:	This study is expected to be awarded through a Cooperative Agreement with a state university or other state entity.
Final Report Due:	TBD
Publications Completed:	None at this time.
Affiliated WWW Sites:	None at this time.
Revised Date:	September 13, 2013